



A RETROSPECTIVE STUDY BETWEEN CLINICAL EXAMINATION, FOCUSED ABDOMINAL SONOGRAM IN TRAUMA AND CT SCAN IN BLUNT INJURY ABDOMEN IN A TERTIARY CARE CENTRE

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ABSTRACT **Aims and Objectives:** Blunt abdominal trauma (BAT) accounts for the majority (80 percent) of abdominal injuries seen in the Emergency Department and is responsible for substantial morbidity and mortality in developing countries. It requires high degree of suspicion, investigation and management. The most commonly injured abdominal organs are liver and spleen. The aim of this study was to find etiology, early diagnosis and management of patients with blunt abdominal trauma based on clinical examination, FAST and CT scan. **Methods:** A retrospective study of 60 cases of blunt Abdominal trauma patients presenting to emergency and outpatient department of Surgery of Silchar Medical College and Hospital from September 2020 to September 2021 was done. **Results:** Amongst the studied cases most common age group involved was (21–30) years (28 cases). Liver was found to be the most common injured organ (22 cases) followed by bowel and spleen. FAST was the most commonly used investigation after blunt abdominal trauma. CT was used only in hemodynamically stable patients (19 cases). The most common intra-operative finding was Intestinal perforation and the most common surgery performed was the repair or resection and anastomosis of intestinal perforation. **Conclusions:** Most common mode of injury was road traffic accidents and predominantly, men were affected. Clinical examination alone is inadequate because patients may have altered mental status. Initial resuscitation followed by physical examination and monitoring of clinical parameters and FAST and computed tomography (CT) abdomen are very important to detect patients with minimal and clinically untraceable sign of abdominal injury. Rapid diagnosis, early timed referral, adequate and trained staff, careful monitoring, early decision to go for operative or nonoperative management can help save many lives.

KEYWORDS : Blunt trauma; Injury; FAST; CT; Accident

Introduction

Trauma is the most common cause of death between the ages of one and 44 years worldwide. In addition to mortality, injuries have the potential to cause many other long term health problems, with serious consequences for individuals, families, communities and health care systems. The economic impact of trauma and injury is huge globally. Blunt abdominal trauma (BAT) accounts for the majority (80 percent) of abdominal injuries seen in the Emergency Department. The blunt abdominal trauma is the result of an impact affecting the abdominal cavity, whatever its location, without any dissolution of the continuity of the abdominal wall. The different modes of blunt abdominal trauma include motor vehicle accidents, fall from height, physical assault out of which motor vehicle accident is the most common cause. In motor vehicle accidents, speed is a critical factor i.e., a 10% increase in impact speed translates to a 40% increase in the case fatality and ejection from a vehicle is associated with a significantly greater incidence of severe injury.² Motorcyclists experience a significantly higher mortality rate than occupants of cars. Many cases of blunt abdominal trauma are missed intra-abdominal injuries and concealed hemorrhage which causes increase morbidity and mortality.³ Clinical examination with simultaneous resuscitation (according to ATLS guidelines) along with focused assessment with sonography in trauma (FAST) and computed tomography (CT) abdomen are ideal in patients with minimal and clinically detectable signs of abdominal injury. A team approach is important for achieving the best possible outcome for traumatized patients.⁴ The interval between trauma and hospitalization especially when patient is being referred from primary health centers, delay in diagnosis, inadequate and lack of appropriate surgical treatment, lack of high dependency units and ICU care, postoperative complications and associated trauma specially to head, thorax and extremities all lead to increase in morbidity and mortality. The multiple injuries suffered makes management of blunt abdominal trauma challenging. The most common organs involved are liver, spleen, intestine.⁵ Management of these injuries can be operative or non-operative, with a trend towards non-operative management recently. The aim of this study was to find etiology, early diagnosis and management of patients with blunt abdominal trauma based on clinical examination, FAST and CT scan.

Methods

A retrospective study of 60 cases of blunt Abdominal trauma patients presenting to emergency and outpatient department of Surgery of Silchar Medical College and Hospital from September 2020 to September 2021 was done. Patients admitted with history of blunt trauma abdomen due to road traffic accidents, fall from height, and trauma by blunt objects and assault, any age group and both sexes were included in the study. All other patients not satisfying above criteria were excluded from the study. Primary survey and simultaneous

resuscitation done to identify any life-threatening injuries and then secondary survey done to identify all other injuries. Based on clinical examination and biochemical tests such as complete blood count, renal function test, liver function test, serum electrolytes; ultrasonography (FAST) and CT scan were done to arrive at a diagnosis. Patients were categorized into hemodynamically stable and unstable ones and closely monitored. On clinical per abdominal examination, most of the patients were found to have a tender, voluntary/involuntary guarded abdomen with sluggish to absent bowel sounds and were further evaluated using radiological techniques. Patients who did not respond to conservative management and were hemodynamically unstable and continued to deteriorate despite adequate resuscitation or who had evidence of bowel involvement were taken for immediate laparotomy.

Results

Total 60 cases were reported and admitted between September 2020 to September 2021. Most common age group affected was 21-30years (28 cases) contributing 46.6% of the cases.

Table 1-Age wise distribution of cases

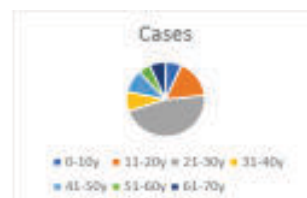


Table 2-Gender distribution



Most frequent mode of injury was found to be road traffic accidents (35) contributing 58.33% of the cases.

Table 3- Mode of injury



Ultrasonography (FAST) was done in all the cases and CT scan was done in 19 cases (31.66%) who were hemodynamically stable. Most common organ injured was liver comprising 22 cases (36.6%) followed by bowel 17 cases (28.33%) and spleen 14 cases (23.33%).

Table 4- Distribution of organs involved

Organs Involved	Cases	Percentage
Liver	22	36.6
Spleen	14	23.3
Small Intestine	10	16.6
Large Intestine	7	11.6
Mesentery	3	5
Kidney	2	3.3
Bladder	2	3.3
Diaphragm	0	-
Retropertoneum	0	-
Stomach	0	-

Hollow viscous perforation was managed by laparotomy, either primary repair or resection and anastomosis. Most common extra-abdominal injury was head injury seen in 15 (25%) followed by rib fracture in 7 (11.66%) and pneumothorax 4 (6.6%).

Table 5- Distribution of extra-abdominal injuries

Extra-abdominal injury	Cases	Percentage
Head injury	15	25
Rib fracture	7	11.6
Pelvis	2	3.3
Femur	3	5
Splene	2	3.3
Pneumothorax	4	6.6
Hemothorax	0	-

25 cases (41.6%) were managed operatively. Overall mortality was 5 (8.3%) with 55 (91.6%) discharged successfully from hospital. Most common cause death was shock with sepsis followed by cardiopulmonary arrest. The most common intra-operative finding was Intestinal perforation and the most common surgery performed was the repair or resection and anastomosis of intestinal perforation.

Table 6- Distribution of operative procedures done

Operative procedure	Cases	Percentage
Splenectomy	6	10
Hepatectomy	0	-
Resection and Anastomosis	6	10
Mesenteric repair	3	5
Primary bowel repair	7	11.6
Diversion stoma	4	6.6
Bladder repair	0	-
Nephrectomy	0	-
Gastric rupture repair	0	-

Table 7- Distribution according to management done



Discussion

The study showed young and previously healthy and economically productive individuals to be victims of blunt abdominal trauma. Injuries range from single organ to multiple organ injuries. Unrecognized abdominal injury is a frequent cause of preventable death after trauma. There is a male predominance of cases 42 cases (70%). The male preponderance is due to the fact adult male are the earning active member of family and more involved in activities like fast driving vehicles, mechanics, automobile drivers, recreational activities, aggressive behavior and may be under influence of alcohol in contrast to females. Easy availability of vehicles, increase number of vehicles and increase number of population, unaccustomed to traffic, traffic sense and ignorance of safety measure leading to increased congestion on roads can directly related to the number of traffic accident.⁷

Significant forces are usually required to injure solid and hollow viscera in abdomen. Three basic mechanism explains the injury to abdominal organs i.e. deceleration, external compression and crushing injuries.⁸ Assessment of hemodynamic stability is most important initial concern in the evaluation of patient with blunt abdominal injury.⁹ In the hemodynamically unstable patient, a rapid evaluation is done by focused assessment with sonogram for trauma (FAST).

Radiographic studies of the abdomen are indicated in stable patient when physical examination is inconclusive.

Plain abdominal radiograph in erect position is helpful in hollow visceral injury. Hollow visceral injury shows free air under domes of diaphragm. The most frequently injured organs in blunt abdominal trauma are liver, spleen, intestine, retro peritoneal organs like kidney, pancreas, urinary bladder etc.⁶ In our study, liver was found to be the most commonly injured organ probably because liver is the largest of all organs and more anteriorly placed, thus more susceptible to injury in blunt trauma. Bowel was found to be second most common organ to be involved (17 cases) in this study and managed by laparotomy. The most common intra-operative finding was intestinal perforation and managed by primary repair and/or resection and anastomosis. The site to be involved most commonly was jejunum followed by ileum and duodenum. Splenectomy was done in 6 cases for grade 4 and grade 5 injuries. Mesenteric injuries were seen in 3 cases associated with bowel injury and were repaired. Low grade solid organ injury is managed conservatively with closed monitoring of clinical vitals, based on USG and CT scan. Some unstable patients required longer time to take hemodynamic stability. ICU care, blood transfusion, other deranged blood investigations are responsible for longer duration of stay in hospital. Wound complications can be seroma, hematoma, surgical site infection, wound dehiscence or hernia and leads to significant postoperative morbidity and mortality. Wound infection was the most common complications after undergoing surgery. The causes of sepsis/infection in these patients were necrotic tissue, mutilating injuries and late presentation in some patients. A primary cause of wound dehiscence is inadequate or imperfect aseptic technique.

Conclusion

The most common cause of Blunt Trauma Abdomen was road traffic accident followed by fall from height and assault. Males were predominantly involved in RTA. Urban areas were mainly involved in RTA. Strict adherence to traffic rules, better road infrastructure, following traffic rules sincerely with special focus on youth and active strata of population will surely help to decrease incidence of blunt trauma. Use of seatbelts reduces the risk of death or serious injury for front seat occupants by approximately 45%. In direct frontal RTA, airbags reduce the risk of fatality by approximately 30%. Liver was the most commonly injured organ after BAT followed by gastrointestinal tract and spleen in this study. In hollow viscous organs, jejunum was the most common injured organ in contrast to other studies was ileum was the most affected organs. Physical examination should be done properly according to ATLS guidelines which will help us in diagnosing possible abdominal injuries. Ultrasound has established its role in assessment of traumatized patients and also due to its wide availability, low cost and better sensitivity although it is operator dependent. In the presence of fluid and a hemodynamically stable patient, further assessment by way of CT can be performed. Therefore, rapid diagnosis, early and timely referral, adequate and trained staff, close and careful monitoring, early wise and skilled decision to go for operative or nonoperative management can help save many lives. A holistic approach to polytrauma can help us reduce morbidity and mortality associated with blunt trauma abdomen.

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